

Greetings and welcome to the **NOVEMBER 2014** edition of the WDFW Climate News Digest, a monthly newsletter intended to provide highlights of relevant climate change news, events and resources for WDFW staff. Feedback or suggestions for items to include in future editions are much appreciated – many *thanks* to those who have sent links and references and please keep them coming. Note that previous editions of the newsletter are now stored on the Habitat Program Sharepoint site and on the agency's climate change web page.

Thanks for contributions this month from Dolores Noyes, Bob Vadas, Dan Ayres, Dawn Phelps, Maria Hunter, Marc Hayes and Lisa Hallock.

WHAT'S HAPPENING AT WDFW?

The Puget Sound Marine and Nearshore Grant Program works to advance climate change adaptation

The Puget Sound Marine and Nearshore Grant Program (administered jointly by WDFW and DNR) is committed to funding projects that advance restoration and protection priorities for Puget Sound while also building resilience to the impacts of climate change. The Program is seeking input on how to disseminate results from climate-related projects, as well as ways in which to engage in new and ongoing climate work related to marine and nearshore habitat restoration. Attached is a short description of highlighted projects the Grant Program has funded that support climate adaptation goals; for a full list of funded projects, please visit the Grant Program website http://wdfw.wa.gov/grants/ps_marine_nearshore/ or contact Maria Hunter at Maria.Hunter@dfw.wa.gov.

CLIMATE ADAPTATION AT OTHER ORGANIZATIONS

EPA launches collaborative of stakeholders to advance green infrastructure

EPA's Green Infrastructure Program and the White House Council on Environmental Quality have launched a broad collaborative of external stakeholders to advance the implementation of green infrastructure. The Green Infrastructure Collaborative will leverage efforts from the federal family, non-governmental organizations, the private sector, and academia to advance green infrastructure as a means of supporting water quality and community development goals.

Pentagon calls climate an 'immediate risk' to national security, releases a plan for the military

The Pentagon released a landmark report declaring climate change an "immediate risk" to national security and outlining how it intends to protect bases, prepare for humanitarian disasters and plan for global conflicts. The 20-page "**2014 Climate Change Adaptation Roadmap**" warns that rising sea levels could flood coastal military bases in the United States and around the world, while droughts and extreme weather could leave military training areas vulnerable, hinder the execution of amphibious landings or complicate surveillance and reconnaissance capability.

Hunting and fishing groups voice support for action on climate change

Over three hundred hunting, fishing, and outdoors groups and individuals [signed a letter](#) to the president voicing their support for the Administration's rule aimed at curbing carbon emissions from existing power plants. The sportsmen's groups, which include Trout Unlimited and Pheasants Forever, are part of what they say is a \$90 billion hunting and fishing industry and combined represent millions of members. The groups singled out the president's Climate Action Plan and executive order on climate preparedness as

positive steps toward protecting the environment from the worst impacts of climate change, and said that they were especially pleased by the president's recognition that responding to climate change requires steps to reduce the carbon pollution that threatens fish and wildlife.

LEARNING OPPORTUNITIES

November 13, 11:00-12:00 (Pacific Time), NOAA Science Seminar – “**How does eelgrass affect carbonate chemistry in the nearshore and what does it mean for thinking about ocean acidification in Puget Sound?**”, Brooke Love, Ph.D., Environmental Science, Huxley College of the Environment, Western Washington University and Shannon Point Marine Center. Audio: (650) 479-3207; access code: 807 346 573

November 20, 10:00-11:00 am (Pacific time), **NPLCC Science-Management Webinar: “Correlation and climate sensitivity of human health and environmental indicators in the Salish Sea”**. [Registration is required.](#)

November 20-21, Workshop -- “Climate Change Impacts to Willapa Bay Tidal Marshes: *Implications for planning and adaptation*”

The USGS Coastal Ecosystem Response to Climate Change (CERCC) team is hosting a workshop to connect with local managers and decision-makers to provide updates on research studies and identify management science needs for climate change adaptation planning and implementation. Workshops are being conducted at eight sites on the Pacific Coast. Workshop date and location: 20-21 November 10 am - 4 pm at the Pacific County Utility District Auditorium (9610 Sandridge Rd., Long Beach, WA). Food and beverages will be provided.

Please check out the workshop agenda! Your participation is important and will help inform the direction of climate science for coastal ecosystems. [RSVP to confirm your attendance.](#)

November 20, 10:00 Pacific time, National Adaptation Forum Webinar -- “Out of Town, Not Out of Trouble: Small Agriculture and Indigenous Communities”.

The webinar will feature John Wiener, Ph.D., Research Associate, Program on Environment and Society, University of Colorado at Boulder and Julie Maldonado, Ph.D. Lead Author, U.S. National Climate Assessment; Ph.D., Department of Anthropology, American University. [Click HERE to register.](#)

November 25, 9:00 Pacific time, “Making Blue Carbon Work: Building Blue Carbon Projects and the GEF Blue Forests Project”, by Steven Lutz and Christian Neumann of GRID-Arendal. Blue carbon projects can work! A new report entitled ‘Building Blue Carbon Projects: An Introductory Guide’ showcases how using the value of carbon stored and sequestered in marine and coastal ecosystems can support conservation and sustainable management. This report aims to stimulate the discussion around projects that use a blue carbon approach, while also highlighting common blue carbon project elements and key issues from existing projects. Download ‘Building Blue Carbon Projects: An Introductory Guide’ at: <http://bluecarbonportal.org/blog/blue-carbon-projects-can-work-new-report-shows>. **Register for the webinar at <https://www1.gotomeeting.com/register/425335801>.**

December 2, 11:00 am (Pacific time) - Webinar, Predicting Climate Change Impacts on River Ecosystems and Salmonids across the Pacific Northwest

December 2-3, 3rd Annual Climate Change and Indigenous Peoples Conference – The University of Oregon will host the 3rd Annual Climate Change and Indigenous Peoples Conference and Student

Symposium: Environment, Culture and Indigenous Sovereignty in the Americas. There is no registration fee, and the event is open to the public.

December 4, 2:00-3:00 pm (Pacific time)- OneNOAA Science Seminar, **Predicting the effects of sea level rise and future hydrology on salinity intrusion and freshwater export from the Skagit River Estuary** - Northwest Fisheries Science Center Auditorium and webinar. More info [here](#).

Lifting the Fog on Forest Management for Carbon -- Webinar Recording

Dr. Olga Krankina's [webinar](#), discusses carbon cycling in forest ecosystems to show how forest management decisions determine if forest landscapes release CO₂ into the atmosphere or, on the contrary, remove CO₂ and store carbon for the long-term. For background see chapter 5 in http://oregonforests.org/sites/default/files/publications/pdf/For_Carbon_fullrpt.pdf.

RESOURCES

West Coast ocean acidification and hypoxia science panel

The West Coast Ocean Acidification and Hypoxia Science Panel has a new **website**. Learn more about the scientists on the Panel, explore their vision, and discover how they are advancing a bold new knowledge base in service of the region's future. The panel was established in 2013 by the California Ocean Protection Council. The website will provide a venue to disseminate and distribute products that are produced by the Panel as they work to summarize information on key themes identified by decision makers.

Explaining extreme events of 2013 from a climate perspective

A report released by the Bulletin of the American Meteorological Society investigates the causes of a wide variety of extreme weather and climate events from around the world in 2013. *Explaining Extreme Events of 2013 from a Climate Perspective* addresses the causes of 16 individual extreme events that occurred on four continents in 2013. NOAA scientists served as three of the four lead editors on the report. **View a PDF of the Report »**

Chasing Ice – a documentary

(from the film's website) - Chasing Ice is the story of one man's mission to change the tide of history by gathering evidence of our changing planet. Acclaimed environmental photographer James Balog began the Extreme Ice Survey in 2005 – a project which deploys revolutionary time-lapse cameras across the Arctic to capture a multi-year record of the world's changing glaciers. Battling untested technology in subzero conditions, Balog comes face to face with his own mortality. It takes years for Balog to see the fruits of his labor. His hauntingly beautiful videos compress years into seconds and capture ancient mountains of ice in motion as they disappear at a breathtaking rate. **Watch the trailer**

US Forest Service technical report: Climate Change Effects on Vegetation in the Pacific Northwest

The US Forest Service recently published a technical report titled "Climate Change Effects on Vegetation in the Pacific Northwest: A Review and Synthesis of the Scientific Literature and Simulation Model Projections". It includes a brief discussion of climate change adaptation strategies for land managers (resistance, resilience, response) and provides "suggestions for incorporating historical range of variability (HRV) concepts into contemporary management," a topic especially relevant to those engaged in revegetation and restoration efforts.

Guide supporting landscape level conservation in the face of climate change

NatureServe/EBM Tools Network are very pleased to announce the release of a guide to tools that support landscape-level conservation in the face of climate change (*Tools for Landscape-Level Assessment and Planning: A Guide for the North Pacific Landscape Conservation Cooperative*). The guide was developed with funding from the North Pacific Landscape Conservation Cooperative and focuses on tools currently in use in the North Pacific region of the United States and Canada. Much of the guide is applicable to landscape-scale conservation planning in other regions as well. The guide and slides for a presentation about the guide can be downloaded at <http://www.natureserve.org/biodiversity-science/publications/tools-landscape-level-assessment-and-planning>. Please forward to other colleagues who might be interested, and apologies for any cross postings.

Climate Trends and Projections—A Guide to Information and References (Attached)

Authored by David Patte, Science Applications, U.S. Fish and Wildlife Service Pacific Region. With review and contributions from John Abatzoglou, University of Idaho, Katherine Hegewisch, University of Idaho, and Steve Hostetler, U.S. Geological Survey; and the Pacific Region Regional Climate Team.

“This new document provides a brief guide to obtaining the latest information on future climate scenarios. New climate modeling results are available internationally, and finer-scaled projections for the lower 48 states of the United States have been released in 2014. The guide presented here is intended for climate science non-specialists who are seeking the latest information on future climate scenarios and do not have the need or capacity for further GIS or other data transfer and interpretation. Specialists and researchers who intend to use climate modeling outputs for further analyses and other modeling (e.g., hydrologic, vegetative modeling, landscape conservation planning) will have other selection options to consider.”

Climate video Explaining the origins of ENSO

This National Geographic video explains the origins of the El Niño Southern Oscillation using animations and shows the impacts on humans, wildlife and habitat, particularly in the United States

Several studies on the topic of climate change and beaver are provided in the links below.

- Beaver and Climate Change in North America: <http://www.beaversww.org/assets/PDFs/BeaverandClimateChangeFinal-1.pdf>
- Nonprofit group website with beaver and climate change adaptation links: <http://www.landscouncil.org/beaversolution/>
- a series of webinars on climate/beaver by the North Pacific LCC: <http://northpacificlcc.org/News/09-02-2014/using-beaver-to-restore-streams-the-state-of-the-art-and-science>
- Link to the Dan Isaak Blog post that addresses the topic of climate change and beaver: http://www.fs.fed.us/rm/boise/AWAE/projects/stream_temp/blogs/59Part%204_ManagingHabitat_BeaverinUpTheBottomsToKeepWaterOnTheLandscape.pdf
- US Forest Service product generally introducing the topic of climate change and beaver management: <https://vimeo.com/98496024>

A Climate-Informed conservation blueprint for the greater Puget Sound Ecoregion

With the support of the Sierra Club, EcoAdapt and the Geos Institute partnered to create climate-informed conservation "blueprints" for western Washington in order to highlight and prioritize areas and actions likely to increase the success of conservation efforts in a rapidly changing climate. These maps identify areas that have particular ecological value and are predicted to have greater ecological stability or instability under changing climatic conditions. This information may be used to suggest priority areas and strategic conservation actions that, when combined, may provide species and ecosystems with a greater likelihood of persistence and function throughout the rapidly changing climate over the next 75 years.

CLIMATE SCIENCE NEWS

November edition of the State Climatologist Newsletter

The November edition of the Washington State Climatologist newsletter is now available for download on their [website](#) and attached to this email. Topics include the October climate summary, a drought update, a note on cold season thunderstorms, and the temperature and precipitation outlook from the Climate Prediction Center.

Past measurements may have missed massive ocean warming

Earth's oceans have absorbed more than 90% of the warming caused by greenhouse gases, researchers estimate, with the stored heat showing up as warmer seawater. But a new analysis suggests scientists may have underestimated the size of the heat sink in the upper ocean—which could have implications for researchers trying to understand the pace and scale of past warming.

Arctic ice melt doubles risk of frigid Eurasian winters, study finds

A new study finds that global warming-related sea ice melt in a portion of the vast Arctic Ocean has doubled the risk of colder and snowier winters in Eurasia since 2004. The study examines the ties between rapid Arctic warming and the rest of the Northern Hemisphere. Much of that research is still highly contentious in the mainstream climate science community, but scientists agree that the Arctic is warming at a rate about twice as fast as that of the rest of the globe, and this is rapidly depleting the region's sea ice, mainly during the summer and early fall, that rapid Arctic warming is altering the exchange of heat and moisture between the ocean and atmosphere across the Arctic and arctic warming may be helping to alter the broader jet stream, which is a corridor of high winds at about 35,000 feet that acts as a weather highway, blowing from west to east across the hemisphere. The new study, published in the journal *Nature Geoscience*, uses 100 computer models as well as observational data to show that recent trends toward colder winters in much of Russia, China, and portions of eastern Europe may be related to the loss of sea ice in the Barents and Kara Sea.

September was warmest on record, NASA data shows

Like August before it, September 2014 was the warmest September on record, according to newly updated NASA data. The warm month makes it even more likely that 2014 will become the warmest year on record. This September was about 1.4°F above the 1951-1980 average temperature for the month, data from NASA's Goddard Institute for Space Studies (GISS) showed. That makes it the warmest September in GISS records, edging out the previous September record set in 2005. GISS records extend back to 1880.

Antarctic sea ice reaches new record maximum

From Science Daily

Sea ice surrounding Antarctica reached a new record high extent this year, covering more of the southern oceans than it has since scientists began a long-term satellite record to map the extent in the late 1970s. The upward trend in the Antarctic, however, is only about a third of the magnitude of the rapid loss of sea ice in the Arctic Ocean.

Due to landscape fragmentation, Brazil's rainforests are releasing more carbon dioxide than previously thought

from Science Daily

Because of the deforestation of tropical rainforests in Brazil, significantly more carbon has been lost than was previously assumed. The effect of the degradation has been underestimated in fragmented forest

areas, since it was hitherto not possible to calculate the loss of the biomass at the forest edges and the higher emission of carbon dioxide

Uncertainty in hydrologic modelling for estimating hydrologic response due to climate change (Santiam River, Oregon), Surfleet and Tullos, paper attached.

(excerpt from the abstract) This paper explores the predicted hydrologic responses associated with the compounded error of cascading global circulation model (GCM) uncertainty through hydrologic model uncertainty due to climate change. A coupled groundwater and surface water flow model (GSFLOW) was used within the differential evolution adaptive metropolis (DREAM) uncertainty approach and combined with eight GCMs to investigate uncertainties in hydrologic predictions for three subbasins of varying uncertainty of predicted responses compared to GCM uncertainty. This analysis demonstrates the value and limitations of cascading uncertainty from GCM use through uncertainty in the hydrologic model, offers insight into the interpretation and use of uncertainty estimates in water resources analysis, and illustrates the need for a fully nonstationary approach with respect to calibrating hydrologic models and transferring parameters across basins and time for climate change analyses.

SPECIES AND HABITATS

Fish are relocating towards the poles to avoid warmer waters

from Oregon Public Broadcasting

A new study published in the ICES Journal of Marine Science looked at historical data for more than 800 commercial fisheries around the world and found that fish are heading to deeper waters and higher latitudes as the world's oceans warm. William Cheung, an associate professor at the Fisheries Center at the University of British Columbia and lead author of the study says "In the last few decades many species are shifting their distribution and what we are projecting is that this trend will continue." Cheung's modeling suggests that if carbon emission rates remain the same, fish populations will relocate — moving an average rate of 26 kilometers per decade in search of cooler waters. He said fish that live closer to the surface will be under more pressure to head to cooler waters than fish that live at greater depth. Surface waters, globally, are warming more rapidly, according to the Intergovernmental Panel on Climate Change

Climate change alters the ecological impacts of seasons

From Science Daily

George Wang, a postdoctoral fellow at the Max Planck Institute for Developmental Biology in Tübingen, Germany, is part of a research tandem that has found that the daily and nightly differences in temperatures worldwide are fast approaching yearly differences between summer and winter temperatures. Changes have been most dramatic for places closest to the poles and far from oceans. "In these places, warmer winters -- decreasing the difference between summer and winter -- and hotter days -- increasing the difference between day and night -- mean that the range of temperatures, which organisms experience over a few days, is closer to the range of temperatures they experience over an entire year. These patterns are strongest in Canada and Russia, but occur even in Germany," explains Wang. "For example, in Wiesbaden, in 1992, the average difference between day and night was 1.2 degrees, while the average difference between summer and winter was 24.8 degrees. In 2012, the day/night cycle was 5.2 degrees, while the summer/winter cycle was 18.9, so the daily temperature variability is now much more similar to the yearly variability.

Predicting vulnerabilities of north american shorebirds to climate change, Galbraith et al

(excerpt from the abstract) - Despite an increase in conservation efforts for shorebirds, there are widespread declines of many species of North American shorebirds. We wanted to know whether these declines would be exacerbated by climate change, and whether relatively secure species might become at-risk species. Virtually all of the shorebird species breeding in the USA and Canada are migratory, which means climate change could affect extinction risk via changes on the breeding, wintering, and/or migratory refueling grounds, and that ecological synchronicities could be disrupted at multiple sites. The number of species that changed risk categories in our assessment is sensitive to how much of an effect of climate change is required to cause the shift, but even at its least sensitive, 20 species were at the highest risk category for extinction.

Black brant have shifted their distribution to take advantage of recently formed habitat along the Arctic Coastal Plain

Scientists have documented that increasing numbers of black brant are skipping their southern migration and staying in Alaska instead. Fewer than 3,000 wintered in Alaska before 1977. In recent years, however, more than 40,000 have remained north, with as many as 50,000 staying there last year, during the most ice-free winter that the region had seen in more than a decade.

Warning times for species extinctions due to climate change

(from Science Daily)

Climate change is expected to result in heightened risk of extinction for many species. Because conservation scientists are just starting to understand this threat, many have concluded that current risk assessment protocols, such as the International 'Red List' published by the International Union for Conservation of Nature (IUCN) and based on rules established in the 1990s, will fail to identify many species at risk from climate change. However, an international team of researchers, including Professor Resit Akçakaya of Stony Brook University's Department of Ecology and Evolution, counter that current assessment methods are able to identify such species. Their findings are published in the journal *Global Change Biology*.

Climate change impacts in Hawaii: A summary of climate change and its impacts to Hawaii's ecosystems and communities

This report, from Hawaii Sea Grant, is intended to provide a basic summary of the observed and projected changes to Hawaii's ecosystems and their resulting impacts for Hawaii's residents.

POLICY AND MANAGEMENT - MITIGATION AND ADAPTATION

Iowa's scientists release statement on health effects of climate change

Over 180 science faculty members and researchers from 38 colleges endorsed this year's Iowa Climate Statement, which was released at the Iowa Capitol. The aim of the statement is to increase Iowans' access to resources and scientific data. This was the fourth year the annual statement has been released. The authors focused on four different impacts of climate change on human health. More frequent and heavy rains and extreme heat will increase the risk of injury, diseases and mental health problems, elevated pollen levels will increase allergies and asthma, more pollution will likely increase lung and heart disease in warmer cities and water will be less available for drinking and recreation.

News from the White House -- Building community resilience by strengthening America's natural resources and supporting green infrastructure

The Council on Climate Preparedness and Resilience has released the *Priority Agenda for Enhancing the Climate Resilience of America's Natural Resources*. The document outlines four priority strategies to help make our natural resources more resilient to climate change, documenting progress and providing roadmaps for action moving forward.

[View a PDF of the Report »](#)

[Read the White House Fact Sheet »](#)

Better Growth, Better Climate: The New Climate Economy Report

A new report released by the Global Commission on the Economy and Climate concludes that rapid innovation and new investment in infrastructure are making it possible to tackle climate change while also improving economic performance.

[Download a PDF of the Report »](#)

[View the Report Website »](#)